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| 10/636,035 | 08/06/2003 | Vishwanath Bhat | MI22-2273 | 9966 |
| 21567 | 7590 | 08/10/2004 | EXAMINER | |
| WELLS ST. JOHN P.S. 601 W. FIRST AVENUE, SUITE 1300 SPOKANE, WA 99201 | | | KENNEDY, JENNIFER M | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2812 | |

DATE MAILED: 08/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/636,035

Applicant(s)

BHAT ET AL.

Examiner

Jennifer M. Kennedy

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 May 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-67 is/are pending in the application.
- 4a) Of the above claim(s) 3,8 and 25-67 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-7 and 9-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

Applicant's election of claims 1, 2, 4-7 and 9-24 in the reply filed on May 21, 2004 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claims 3, 8, and 25-67 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on May 21, 2004.

Claim Rejections - 35 USC § 102

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 4-7, 9-11, 16-18, 22-24 are rejected under 35 U.S.C. 102(b) as being anticipated by Hunt et al. (U.S. Patent No. 6,207,522).

In re claim 1, Hunt et al. discloses a method of forming a capacitor (500), comprising:

forming a conductive material first electrode layer (502) over a substrate (501), the conductive metal being oxidizable to a higher degree at and above an oxidation temperature as compared to any degree of oxidation below the oxidation temperature;

feeding at least one oxygen containing vapor precursor to the conductive metal first electrode layer below the oxidation temperature under conditions effective to form at first portion oxide material of a capacitor dielectric region over the conductive metal first electrode layer (see column 34, lines 44-55, and column 26, line 25 through column 27, line 55);

feeding at least one oxygen containing vapor precursor over the first portion at a temperature above the oxidation temperature effective to form a second portion oxide material of the capacitor dielectric region over the first portion, the oxide material of the first portion and the oxide material of the second portion being common in chemical composition (see column 34, lines 44-55, and column 26, line 25 through column 27, line 55); and

forming a conductive second electrode (506) layer over the second portion oxide material of the capacitor dielectric region.

In re claim 2, Hunt et al. discloses the method wherein the first and second portions are formed from a common vapor precursor (see Example 16).

In re claim 4, Hunt et al. discloses the method wherein the first and second portions are formed by chemical vapor deposition (CCVD, see column 34, lines 44-55).

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In re claim 5, Hunt et al. discloses wherein the first and second portions are formed by chemical vapor deposition using at least one common vapor precursor (CCVD, see column 34, lines 44-55 and Example 16).

In re claim 6, Hunt et al. discloses wherein the first and second portions are formed by chemical vapor deposition respectively comprising feeding multiple vapor precursors simultaneously to the substrate (CCVD, see column 34, lines 44-55 and Example 16).

In re claim 7, Hunt et al. discloses the method wherein the first and second portions are formed by chemical vapor deposition respectively comprising feeding common multiple vapor precursors simultaneously to the substrate (CCVD, see column 34, lines 44-55 and Example 16).

In re claim 9, Hunt et al. discloses the method wherein the first portion is formed on the conductive metal first electrode layer (504, see column 34, lines 44-55).

In re claim 10, Hunt et al. discloses the method wherein the second portion is formed on the first portion (504, see column 34, lines 44-55).

In re claim 11, Hunt et al. discloses the method wherein, the first portion is formed on the conductive metal first electrode layer, and the second portion is formed on the first portion (504, see column 34, lines 44-55).

In re claim 16, Hunt et al. discloses the method wherein the oxide material comprises aluminum oxide (see column 26, lines 25-40).

In re claim 17, Hunt et al. discloses the method wherein the oxide material consists essentially of aluminum oxide, and an entirety of the capacitor dielectric region

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intermediate the first and second electrode layers consists essentially of aluminum oxide (see column 26, lines 25-40). The examiner notes that Hunt et al. discloses that the silica based materials may have as little as 1% by weight silica. The examiner takes 1% silica mixed with Aluminum oxide to be essentially aluminum oxide.

In re claim 18, Hunt et al. discloses the method wherein the first portion oxide material is formed without any measurable oxidation occurring of the metal first electrode layer (see column 34, lines 44-55).

In re claims 22-24, Hunt et al. the method wherein the precursor flowing during formation of the second portion oxide material is at a temperature which is at least 25 °C, 50 °C , or 100 °C higher during formation of the first portion oxide material (see column 34, lines 44-55).

Claims 1, and 12-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Takemura (U.S. Patent No. 6,218,233).

In re claim 1, Takemura et al. discloses a method of forming a capacitor (500), comprising:

forming a conductive material first electrode layer (10, 11, 12, 13) over a substrate (9), the conductive metal being oxidizable to a higher degree at and above an oxidation temperature as compared to any degree of oxidation below the oxidation temperature;

feeding at least one oxygen containing vapor precursor to the conductive metal first electrode layer below the oxidation temperature under conditions effective to form

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at first portion oxide material of a capacitor dielectric region over the conductive metal first electrode layer (see column 12, lines 15-21);

feeding at least one oxygen containing vapor precursor over the first portion at a temperature above the oxidation temperature effective to form a second portion oxide material of the capacitor dielectric region over the first portion, the oxide material of the first portion and the oxide material of the second portion being common in chemical composition (see column 12, lines 21-25); and

forming a conductive second electrode (16) layer over the second portion oxide material of the capacitor dielectric region.

In re claim 12, the method wherein the conductive material comprises a metal nitride (11).

In re claims, 13-15 the method wherein the first portion is formed to a thickness which is less than that of the second portion, where in the first portion is formed to a thickness which is no greater than one third or one fifth that of the second portion (see column 12, lines 15-25).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hunt et al. (U.S. Patent No. 6,207,522).

In re claims 13-15, Hunt et al. discloses the method as claimed and rejected above, but does not explicitly disclose the method wherein the first portion is formed to a thickness which is less than that of the second portion, where in the first portion is formed to a thickness which is no greater than one third or one fifth that of the second portion.

The examiner notes that Applicant does not teach that the relative thicknesses of the first and second portion solve any stated problem or are for any particular purpose. Therefore, the relative thicknesses of the first and second portion lack criticality in the claimed invention and does not produce unexpected or novel results. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the first portion is to a thickness which is less than that of the second portion, and wherein the first portion is formed to a thickness which is no greater than one third or one fifth that of the second portion, since the invention would perform equally well when the relative thicknesses are different and as Hunt et al. teaches, any initial coating of silica will prevent oxidation of the underlying metal layer and because it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233, MPEP 2144.05 II A.

Claims 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hunt et al. (U.S. Patent No. 6,207,522) in view of Wu (U.S. Patent No. 6,265,259).

In re claim 19-21, Hunt et al. discloses the method as claimed and rejected above, but does not disclose the method wherein the second portion oxide material and the first portion oxide material are formed using the same pressure, and identical conditions other than the change in temperature and wherein the first and second portions are formed in a common deposition chamber without removing the substrate from such chamber intermediate formation of the first and second portions. The examiner notes that in column 34, lines 43-55 of Hunt et al. only the temperature is required to be changed.

Wu discloses the method of forming the layers of the same material, one on top of the other with the same pressure and other conditions other than that which was required to be changed (dopant) and without removing the substrate from the chamber (see column 3, lines 10-35). It would have been obvious to one of ordinary skill in the art at the time the invention was made to only change the temperature as required by Hunt et al. such that two layers of the same composition are formed with the same pressure and other conditions other than that which was required to be changed (temperature) and without removing the substrate from the chamber in order to simplify the process and prevent contamination.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer M. Kennedy whose telephone number is (571) 272-1672. The examiner can normally be reached on Mon.-Fri. 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on (571) 272-1679. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Jennifer M. Kennedy
Patent Examiner
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jmk